claims 31-33, 55, 56, 67-70, 109 and 117 have been amended to better encompass the full scope and breadth of the invention notwithstanding, Applicants belief that the claims would have been allowable as originally filed. Accordingly, Applicants assert that no new matter has been added and no claims have been narrowed within the meaning of *Festo*. Accordingly, claims 31-33, 38-39, 46-51, 55-58, 65-70, 83-94, 99, 106-110 and 115-117 are still pending herein, and, for the reasons set forth in detail below, are believed to be in condition for allowance.

Initially, the *Office Action* rejects claims 76 and 78 under 35 U.S.C. §112, second paragraph as being indefinite. Due to the above actions, claims 76 and 78 10 have been canceled, thereby rendering the rejection moot.

The *Office Action* rejects claims 31-98 and 109-117 under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-4 and 17-19 of U.S. Patent No. 5,594,569. Applicants respectfully request that this rejection be held in abeyance until an indication of allowability has been received.

The *Office Action* rejects claims 31 and 32 under 35 U.S.C. §102(b) as being anticipated by ***Yamamoto*** (U.S. Patent No. 5,221,980), claims 33-66 under 35 U.S.C. §103(a) as being unpatentable over ***Yamamoto '980*** in view of ***Tsuboyama*** (U.S. Patent No. 4,796,979) and ***Tsuboyama*** (U.S. Patent No. 4,775,225) and claims 67-78, 83-98, 110 and 114-115 under 35 U.S.C. §103(a) as being unpatentable over ***Tsuboyama '979***. Applicants respectfully contend that the claims as amended are patentably distinct over the prior art at least for the reasons solicited hereinbelow.

Claims 31-33, 55, 56, 67-70, 109 and 117 as amended are directed to a liquid crystal device comprising a grain comprising a resin wherein the grain is provided between liquid crystal molecules of a liquid crystal layer which are adjacent to each other. This feature is supported at least on page 39, lines 18-27 of the specification. Such a feature yields benefits which are not set forth in the prior art of record. For example, in observing the state of switching operation in conventional liquid-crystal electro-optical devices using a ferroelectric liquid crystal or antiferroelectric liquid crystal through a polarization microscope, Applicants have ascertained that a large number of domains of a dark state appear in a bright state or a large number of domains of a bright state appear in a dark state by gradually increasing a magnitude of an applied voltage, and the respective areas are gradually enlarged. Meaning, the switching operation of the ferroelectric liquid crystal or the

antiferroelectric liquid crystal comes to a chain-reactive switching operation in which, with a part of liquid-crystal molecules being inverted as a start, other liquid-crystal molecules existing around the part of liquid-crystal molecules are inverted one after another.

In order to obviate the aforementioned disadvantage, Applicants have found that by providing a resin between the layers of the adjacent liquid-crystal molecules in such a way that they have a size and a configuration of the degree that the orientation of the liquid-crystal molecules is not disturbed. Thus, it is considered that the chain of the inversion is interrupted by the resin, as a result of which further inversion of the peripheral liquid-crystal molecules is not induced. That is, it is considered that the resin prevents the adjacent liquid-crystal molecules from being inverted in the chain reactive manner, as a result of which the liquid-crystal molecules or the extreme minute domains do not induce the inversion of the liquid-crystal molecules around the inverted ones, but the respective liquid-crystal molecules are independently inverted. Therefore, it is expected that, within a specified region, for example, within one-pixel region, extremely minute regions exhibiting a bright state or a dark state appear at a specified rate by a specified applied voltage to the liquid crystal layer comprising the resin grain, and the transmitted light amount is continuously changed by applied voltage without occurrence of the domain to thereby obtain a halftone.

For at least the reasons given above, Applicants respectfully submit that the foregoing features are not expressly taught or implicitly suggested in ***Yamamoto '980***, ***Tsuboyama '979*** or ***Tsuboyama '225***. Accordingly, Applicant respectfully submits that the pending claims are in condition for allowance, and thus, reconsideration is respectfully requested. Should the Examiner believe any further communications is desirable in order to place the application in even better condition for allowance, he/she is encouraged to contact Applicant's undersigned representative at the telephone number listed below.

Respectfully submitted,

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MARKED-UP COPY OF AMENDED CLAIMS.

31. (Amended) A liquid crystal [electro-optical] device comprising:

a pair of substrates;

[an electro-optical modulating] a liquid crystal layer comprising a ferroelectric liquid crystal provided between said substrates, said [electro-optical modulating] liquid crystal layer not having a helical structure of said ferroelectric liquid crystal between said substrates;

a grain comprising a resin;

an electrode provided over each of said substrates for applying an electric field to said ferroelectric liquid crystal; and

an orientation film provided over one of said substrates,

wherein said [electro-optical modulating] liquid crystal layer does not have memory characteristic, and

wherein said grain comprising said resin is provided between liquid crystal molecules of said liquid crystal layer which are adjacent to each other.

32. (Amended) A liquid crystal [electro-optical] device comprising:

a pair of substrates;

[an electro-optical modulating] a liquid crystal layer comprising a ferroelectric liquid crystal provided between said substrates, said [electro-optical modulating] liquid crystal layer not having a helical structure of said ferroelectric liquid crystal between said substrates;

a grain comprising a resin;

an electrode provided over each of said substrates for applying an electric field to said ferroelectric liquid crystal; and

an orientation film provided over one of said substrates,

wherein said [electro-optical modulating] liquid crystal layer does not have bistability, and

wherein said grain comprising said resin is provided between liquid crystal molecules of said liquid crystal layer which are adjacent to each other.

33. (Amended) A liquid crystal [electro-optical] device comprising:

a pair of substrates;

[an electro-optical modulating] a liquid crystal layer comprising a antiferroelectric liquid crystal provided between said substrates, said [electro-optical modulating] liquid crystal layer not having a helical structure of said antiferroelectric liquid crystal between said substrates;

a grain comprising a resin;

an electrode provided over each of said substrates for applying an electric field to said antiferroelectric liquid crystal; and

an orientation film provided over one of said substrates,

wherein said [electro-optical modulating] liquid crystal layer does not have memory characteristic, and

wherein said grain comprising said resin is provided between liquid crystal molecules of said liquid crystal layer which are adjacent to each other.

49. (Amended) The device of claim 31 wherein said liquid crystal [electro-optical] device is an active matrix type.

50. (Amended) The device of claim 32 wherein said liquid crystal [electro-optical] device is an active matrix type.

51. (Amended) The device of claim 33 wherein said liquid crystal [electro-optical] device is an active matrix type.

55. (Amended) A liquid crystal [electro-optical] device comprising:

a pair of substrates;

[an electro-optical modulating] a liquid crystal layer comprising a ferroelectric liquid crystal provided between said substrates, said [electro-optical modulating] liquid crystal layer not having a helical structure of said ferroelectric liquid crystal between said substrates;

a grain comprising a resin;

an electrode provided over each of said substrates for applying an electric field to said ferroelectric liquid crystal;

an orientation film provided over one of said substrates; and

[a resin and] a spacer provided between said substrates,

wherein said [electro-optical modulating] liquid crystal layer does not have memory characteristic, and

wherein said grain comprising said resin is provided between liquid crystal molecules of said liquid crystal layer which are adjacent to each other.

56. (Amended) A liquid crystal [electro-optical] device comprising:

a pair of substrates;

[an electro-optical modulating] a liquid crystal layer comprising an antiferroelectric liquid crystal provided between said substrates, said [electro-optical modulating] liquid crystal layer not having a helical structure of said antiferroelectric liquid crystal between said substrates;

a grain comprising a resin;

an electrode provided over each of said substrates for applying an electric field to said antiferroelectric liquid crystal;

an orientation film provided over one of said substrates;

[a resin and] a spacer provided between said substrates,

wherein said [electro-optical modulating] liquid crystal layer does not have memory characteristic, and

wherein said grain comprising said resin is provided between liquid crystal molecules of said liquid crystal layer which are adjacent to each other.

67. (Amended) A liquid crystal [electro-optical] device comprising:

a pair of substrates;

[an electro-optical modulating] a liquid crystal layer comprising a ferroelectric liquid crystal provided between said substrates, said [electro-optical modulating] liquid crystal layer not having a helical structure of said ferroelectric liquid crystal between said substrates; and

a grain comprising a resin;

a pixel comprising a transparent pixel electrode provided between said substrates,

wherein transmitted light amount of said pixel takes a halftone without occurrence of a domain, and

wherein said grain comprising said resin is provided between liquid crystal molecules of said liquid crystal layer which are adjacent to each other.

68. (Amended) A liquid crystal [electro-optical] device comprising:

a pair of substrates;

[an electro-optical modulating] a liquid crystal layer comprising a ferroelectric liquid crystal provided between said substrates, said [electro-optical modulating] liquid crystal layer not having a helical structure of said ferroelectric liquid crystal between said substrates; and

a grain comprising a resin;

a plurality of pixels each comprising a transparent pixel electrode provided between said substrates,

wherein transmitted light amount of each of said pixels takes a halftone throughout an entire surface of the corresponding transparent pixel electrode, and

wherein said grain comprising said resin is provided between liquid crystal molecules of said liquid crystal layer which are adjacent to each other.

69. (Amended) A liquid crystal [electro-optical] device comprising:

a pair of substrates;

[an electro-optical modulating] a liquid crystal layer comprising an antiferroelectric liquid crystal provided between said substrates, said [electro-optical modulating] liquid crystal layer not having a helical structure of said antiferroelectric liquid crystal between said substrates; and

a grain comprising a resin;

a plurality of pixels each comprising a transparent pixel electrode provided between said substrates,

wherein transmitted light amount of each of said pixels takes a halftone without

occurrence of a domain, and

wherein said grain comprising said resin is provided between liquid crystal molecules of said liquid crystal layer which are adjacent to each other.

70. (Amended) A liquid crystal [electro-optical] device comprising:

a pair of substrates;

[an electro-optical modulating] a liquid crystal layer comprising an antiferroelectric liquid crystal provided between said substrates, said [electro-optical modulating] liquid crystal layer not having a helical structure of said antiferroelectric liquid crystal between said substrates; and

a grain comprising a resin;

a plurality of pixels each comprising a transparent pixel electrode provided between said substrates,

wherein transmitted light amount of each of said pixels takes a halftone throughout an entire surface of the corresponding transparent pixel electrode, and

wherein said grain comprising said resin is provided between liquid crystal molecules of said liquid crystal layer which are adjacent to each other.

109. (Amended) A liquid crystal [electro-optical] device comprising:

a pair of substrates;

[an electro-optical modulating] a liquid crystal layer comprising a ferroelectric liquid crystal [material] provided between said substrates;

a grain comprising a resin;

an electrode provided over each of said substrates for applying an electric field to said ferroelectric liquid crystal [material]; and

an orientation film provided over one of said substrates[; and

a resin provided between said orientation film and said ferroelectric liquid crystal material],

wherein said grain comprising said resin is provided between liquid crystal molecules of said liquid crystal layer which are adjacent to each other, and

wherein transmitted light amount of said liquid crystal layer continuously varies in response to voltage applied to said liquid crystal layer.

115. (Amended) The device of claim 109 wherein said liquid crystal [electro-optical] device is an active matrix type.

116. (Amended) A method for forming a liquid crystal [electro-optical] device comprising:

forming an orientation film over one of a pair of substrates each having an electrode;

rubbing said orientation film;

disposing said substrates to oppose said substrates to each other;

injecting a mixture comprising a liquid crystal material and an uncured resin between [said] the opposed substrates after said rubbing; and

[forming a resin between said liquid crystal material and said orientation film]

curing said uncured resin after said injecting to provide a cured resin between said liquid crystal material and said orientation film,

wherein said liquid crystal device comprises a pixel whose transmitted light amount takes a halftone.

117. (Amended) A liquid crystal [electro-optical] device comprising:

a pair of substrates;

[an electro-optical modulating] a liquid crystal layer comprising a ferroelectric liquid crystal provided between said substrates,

an electrode provided over each of said substrates;

an orientation film provided over each of said substrates; and

[a resin provided over said orientation film]

a grain comprising a resin,

wherein said ferroelectric liquid crystal does not have helical structure between said substrates,

wherein said ferroelectric liquid crystal does not produce domain, and

wherein transmitted light amount of said [electro-optical modulating] liquid crystal layer continuously varies in response to voltage applied to said [electro-optical modulating] liquid crystal layer, and

wherein said grain comprising said resin is provided between liquid crystal molecules of said liquid crystal layer which are adjacent to each other.